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A LEVEL MATHS

(11) Applications of Quadratics Equations

WORKING AT D/E

(1) The velocity (V) of a toy car after (t) seconds is given by $V = -t^2 + 8t + 3$ for $0 \leq t \leq 3$

(a) Find the initial velocity of the toy car

(b) Find the velocity of the toy car after 2 seconds.

(c) Show that the car is never stationary.

WORKING AT B/C

(1) The height in metres (h) of a wave produced by a wave machine in a swimming pool over time (t) seconds is modelled by the equation $h = -t^2 + 10t$ for $t \geq 0$

(a) State the initial height of the wave.

(b) Find to 3SF when the wave is first 18m high.

(c) Find the maximum height of a wave,

(d) State, with a reason, the values of t for which the model would be valid.

WORKING AT A*/A

(1) A driver stands on a 5-metre platform and performs a dive into a swimming pool below. The height the diver above the water is modelled by the equation $h = -2t^2 + 2t + k$ where h is the height in metres above the water and t is the number of seconds from when the dive is performed.

(a) State the value of k

(b) Find to 3SF the time the diver hits the water.

(c) How long does it take the diver to reach their maximum height and what maximum height did they reach?

(d) Explain why the model may no longer be valid after the diver hits the water.

(e) Sketch the graph for the model.